

# THE ASTROPHYSICAL JOURNAL

## INDEX TO VOLUME 337, PARTS 1 AND 2

1989 FEBRUARY 1 AND FEBRUARY 15

- ALLOIN, DANIELLE. Detection of Strong Carbon Monoxide Emission from the Host Galaxy of the Quasar I Zw 1. *Richard Barvainis, Danielle Alloin, and Robert Antonucci.* 337, L69, 32-B1 (1989)
- AN, CHANG-HYUK. Magnetohydrodynamic Instabilities in Coronal Arcades. *Chang-Hyuk An, S. T. Suess, and S. T. Wu.* 337, 989, 31-B1 (1989)
- ANTONUCCI, ROBERT. Detection of Strong Carbon Monoxide Emission from the Host Galaxy of the Quasar I Zw 1. *Richard Barvainis, Danielle Alloin, and Robert Antonucci.* 337, L69, 32-B1 (1989)
- APPLEGATE, JAMES H. Magnetic Activity and the Determination of the Tidal Synchronization Time in Close Binaries. *James H. Applegate.* 337, 865, 29-F3 (1989)
- ARTYMOWICZ, PAWEŁ. The Structure of the Beta Pictoris Circumstellar Disk From Combined IRAS and Coronagraphic Observations. *Paweł Artymowicz, Christopher Burrows, and Francesco Paresce.* 337, 494, 23-F1 (1989)
- AVERY, L. W. Collisional Rate Coefficients of  $C_2H_2$  and the Determination of Physical Conditions in Molecular Clouds. *L. W. Avery and Sheldon Green.* 337, 306, 21-B8 (1989)
- BACKER, D. C. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. *J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore.* 337, 671, 27-D1 (1989)
- BAGOLY, Z. Magnetized Neutron Stars as Gamma-Ray Bursters: Detection Rates at High Energies. *P. Mészáros, Z. Bagoly, and H. Riffert.* 337, L23, 25-C1 (1989)
- BAILEY, JEREMY. EXO 033319 - 2554.2: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. *Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough.* 337, 832, 29-C7 (1989)
- BARBARO, GUIDO. Models of Spectral Energy Distributions of Elliptical Galaxies. *Guido Barbaro and Fabrizio M. Olivari.* 337, 125, 18-F6 (1989)
- BARON, E. Pressure-confined Lyman-Alpha Clouds. *E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann.* 337, 609, 26-F1 (1989)
- BARRETT, ALAN H. CO in Optically Selected Starburst Galaxies. *James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett.* 337, 680, 27-D10 (1989)
- BARTEL, NORBERT. VLBI Observations of SN 1986J: Deviations from Spherical Symmetry in Its Radio Brightness Distribution. *Norbert Bartel, Michael R. Rupen, and Irwin I. Shapiro.* 337, L85, 32-C7 (1989)
- BARVAINIS, R. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. *G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis.* 337, 934, 30-D9 (1989)
- BARVAINIS, RICHARD. Detection of Strong Carbon Monoxide Emission from the Host Galaxy of the Quasar I Zw 1. *Richard Barvainis, Danielle Alloin, and Robert Antonucci.* 337, L69, 32-B1 (1989)
- BAUER, WENDY HAGEN. Line Identifications in the Ultraviolet Spectrum of 31 Cygni (Abstract of Paper in 1989 March Suppl.). *Wendy Hagen Bauer and Robert E. Stencel.* 337, 1038, 31-E13 (1989)
- BAZZANO, A. Hard X-Ray Spectrum of Supernova 1987A on Day 407. *P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye.* 337, L19, 25-B11 (1989)
- BEGELMAN, MITCHELL C. Self-absorbed Synchrotron Sources in Active Galactic Nuclei. *Martijn de Kool, Mitchell C. Begelman, and Marek Sikora.* 337, 66, 17-G5 (1989)
- BEICHMAN, C. A. Dust and Gas Emission in Barnard 5. *W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman.* 337, 355, 21-F10 (1989)
- BERNSTEIN, G. M. Anisotropy of the Diffuse Background at Millimeter Wavelengths. *G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk.* 337, L1, 25-A6 (1989)
- BETZ, A. L. Heterodyne Spectroscopy of the  $J = 17-16$  CO Line in Orion. *R. T. Boreiko, A. L. Betz, and J. Zmuidzinas.* 337, 332, 21-D11 (1989)
- BISHOP, JEFFREY L. On the Determination of Distribution Functions by Numerical Methods. *Jeffrey L. Bishop.* 337, 155, 19-B4 (1989)
- BLONDIN, JOHN M. Hebig-Haro Objects as the Heads of Radiative Jets. *John M. Blondin, Arieh Königl, and Bruce A. Fryxell.* 337, L37, 25-D1 (1989)
- BODENHEIMER, PETER. Double-Core Evolution. III. The Evolution of a  $5 M_{\odot}$  Red Giant with a  $1 M_{\odot}$  Companion. *Ronald E. Taam and Peter Bodenheimer.* 337, 849, 29-E1 (1989)
- BOREIKO, R. T. Heterodyne Spectroscopy of the  $J = 17-16$  CO Line in Orion. *R. T. Boreiko, A. L. Betz, and J. Zmuidzinas.* 337, 332, 21-D11 (1989)
- BRAUN, EREZ. Light Reprocessing in the Echo Model of Luminous Arcs. *Erez Braun and Mordehai Milgrom.* 337, 644, 27-A9 (1989)
- BRECHT, STEPHEN H. Minimum Mach Number for Impulsive Proton Acceleration by Parallel Collisionless Shock Waves in Solar Flares. *Dean F. Smith and Stephen H. Brecht.* 337, 954, 30-F1 (1989)
- BREGMAN, JOEL N. The Effects of Magnetic Fields on the Growth of Thermal Instabilities in Cooling Flows. *Laurence P. David and Joel N. Bregman.* 337, 97, 18-C4 (1989)
- BRUECKNER, G. E. Intermediate-Term Solar Periodicities: 100-500 Days. *J. L. Lean and G. E. Brueckner.* 337, 568, 24-E8 (1989)
- BURROWS, CHRISTOPHER. The Structure of the Beta Pictoris Circumstellar Disk From Combined IRAS and Coronagraphic Observations. *Paweł Artymowicz, Christopher Burrows, and Francesco Paresce.* 337, 494, 23-F1 (1989)
- High-Resolution Coronagraphy of the Circumstellar Environment of SN 1987A. *Francesco Paresce and Christopher Burrows.* 337, L13, 25-B6 (1989)
- CADITZ, DAVID. Cosmological Parameters and Evolution of the Galaxy Luminosity Function. *David Caditz and Vahé Petrosian.* 337, L65, 32-A10 (1989)
- CANTÓ, JORGE. VLA Observations of the High-Velocity Bipolar OH Absorption in L1551. *Luis F. Rodríguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz.* 337, 712, 27-G1 (1989)
- CARLSTROM, J. E. Millimeter Continuum Observations of a Massive Protostellar Core in Sagittarius B2. *J. E. Carlstrom and S. N. Vogel.* 337, 408, 22-D3 (1989)
- CARSWELL, R. F. Pressure-confined Lyman-Alpha Clouds. *E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann.* 337, 609, 26-F1 (1989)
- CASEY, S. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey.* 337, 650, 27-B1 (1989)
- CASSAR, L. Lunar Occultations of IRAS Point Sources, 1991-2000 (Abstract of Paper in 1989 March Suppl.). *L. Cassar, W. P. Chen, and M. Simon.* 337, 1038, 31-E13 (1989)
- CASSINELLI, JOSEPH P. A Rotating, Magnetic, Radiation-driven Wind Model for Wolf-Rayet Stars. *Clint H. Poe, David B. Friend, and Joseph P. Cassinelli.* 337, 888, 30-A1 (1989)
- CERRUTI-SOLA, M. Fast Winds from the Central Stars of NGC 6543 and NGC 6826. *M. Perinotto, M. Cerruti-Sola, and H. J. G. L. M. Lamers.* 337, 382, 22-B1 (1989)
- CHAKRABARTI, SANDIP K. Studying Shocks in Model Astrophysical Flows. *Sandip K. Chakrabarti.* 337, L89, 32-C11 (1989)
- CHEN, W. P. Lunar Occultations of IRAS Point Sources, 1991-2000 (Abstract of Paper in 1989 March Suppl.). *L. Cassar, W. P. Chen, and M. Simon.* 337, 1038, 31-E13 (1989)
- CHENG, ANDREW F. Radio Pulsar Spin-Down: Tests of Pulsar Models. *Andrew F. Cheng.* 337, 803, 29-A1 (1989)
- CHENG, F. H. Spectral Evolution of Accretion Disks of Dwarf Novae. II. Radiative Transfer Models. *F. H. Cheng and D. N. C. Lin.* 337, 432, 22-F1 (1989)
- CHENG, K. S. Period Difference between X-Ray and Very High Energy Gamma-Ray Observations of Accreting X-Ray Pulsars. *K. S. Cheng and Malvin Ruderman.* 337, L77, 32-B10 (1989)

- CHERNOFF, DAVID F. Supernova 1987A and the Emergence of the Hot Neutron Star: A Semianalytic Approach. *David F. Chernoff, Stuart L. Shapiro, and Ira Wasserman*. 337, 814, 29-B1 (1989)
- CLAAS, J. J. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. *J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock*. 337, 399, 22-C6 (1989)
- CLAVEL, J. Hot Dust on the Outskirts of the Broad-Line Region in Fairall 9. *J. Clavel, W. Wamsteker, and I. S. Glass*. 337, 236, 20-C7 (1989)
- CLEARY, PAUL W. Periodic Orbits in the Schwarzschild Galactic Potential. *Paul W. Cleary*. 337, 108, 18-D5 (1989)
- CODINA-LANDEBERRY, S. J. The Chemical Composition of the Emitting Gas in HM Sagittae. *J. A. De Freitas Pacheco, S. J. Codina-Landeberry, and Dalton F. Lopes*. 337, 520, 24-A1 (1989)
- COHEN, JUDITH G. Slow Expansion of the Shell of the Recurrent Nova T Pyxidis and Detection of a Faint Extended Envelope. *Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen*. 337, 720, 28-A1 (1989)
- COLES, W. A. Propagation Observations of the Solar Wind near the Sun. *W. A. Coles and J. K. Harmon*. 337, 1023, 31-D10 (1989)
- COLLINS, WILLIAM. The Theory of Magnetohydrodynamic Wave Generation by Localized Sources. I. General Asymptotic Theory. *William Collins*. 337, 548, 24-C12 (1989)
- COMINSKY, L. R. Further Observations of the Eclipsing X-Ray Burst Source MXB 1659 - 29. *L. R. Cominsky and K. S. Wood*. 337, 485, 23-E4 (1989)
- CONTI, PETER S. Spectroscopic Studies of Wolf-Rayet Stars. IV. Optical Spectrophotometry of the Emission Lines in Galactic and Large Magellanic Cloud Stars. *Peter S. Conti and Philip Massey*. 337, 251, 20-D12 (1989)
- CORNWELL, T. J. RX Puppis: Detection of Asymmetrical Radio Structure. *J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliver, A. G. Michalitsianos, and M. Kafatos*. 337, 514, 23-G9 (1989)
- COTÉ, J. Relations between the Photospheric Magnetic Field and the Emission from the Outer Atmospheres of Cool Stars. I. The Solar Ca II K Line Core Emission. *C. J. Schrijver, J. Côté, C. Zwaan, and S. H. Saar*. 337, 964, 30-F12 (1989)
- DAVID, LAURENCE P. The Effects of Magnetic Fields on the Growth of Thermal Instabilities in Cooling Flows. *Laurence P. David and Joel N. Bregman*. 337, 97, 18-C4 (1989)
- DAVIDSON, J. A. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey*. 337, 650, 27-B1 (1989)
- DAVILA, JOSEPH M. The Accretion of Interplanetary Dust by Ap and Am Stars. *C. Krishna Kumar, Joseph M. Davila, and R. Rajan Sundar*. 337, 414, 22-D9 (1989)
- DE BERNARDIS, P. Infrared Emission from Interplanetary Dust. *P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama*. 337, 528, 24-B1 (1989)
- DE FREITAS PACHECO, J. A. The Chemical Composition of the Emitting Gas in HM Sagittae. *J. A. De Freitas Pacheco, S. J. Codina-Landeberry, and Dalton F. Lopes*. 337, 520, 24-A1 (1989)
- DE KOOL, MARTIJN. Self-absorbed Synchrotron Sources in Active Galactic Nuclei. *Martijn de Kool, Mitchell C. Begelman, and Marek Sikora*. 337, 66, 17-G5 (1989)
- DE KORTE, P. A. J. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. *J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock*. 337, 399, 22-C6 (1989)
- DUBISCH, RUSSELL. Using Far-Infrared Limb Brightening to Probe Isolated Dark Globules. *Chun Ming Leung, Estela V. O'Brien, and Russell Dubisch*. 337, 293, 21-A9 (1989)
- DZIEMBOWSKI, W. A. The Radial Gradient in the Sun's Rotation. *W. A. Dziembowski, Philip R. Goode, and K. G. Libbrecht*. 337, L53, 25-E5 (1989)
- EDGAR, B. KEVIN. Properties of H II Region Populations in Galaxies. II. The H II Region Luminosity Function. *Robert C. Kennicutt, Jr., B. Kevin Edgar, and Paul W. Hodge*. 337, 761, 28-D10 (1989)
- EICHLER, DAVID. On the Explosive Origin Hypothesis for Present-Day Cosmic Voids and Peculiar Velocities. *Biman B. Nath and David Eichler*. 337, 1, 17-A9 (1989)
- EISENSTAEDT, J. Density Constraints on Local Inhomogeneity in Cosmology. *J. Eisenstaedt and N. O. Santos*. 337, 601, 26-E4 (1989)
- ENGARGIOLA, G. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey*. 337, 650, 27-B1 (1989)
- ENGLAND, MARTIN N. High-Resolution Neutral Hydrogen Observations: The Barred Spiral Galaxy NGC 1300. *Martin N. England*. 337, 191, 19-F1 (1989)
- FALL, S. MICHAEL. Limits on Dust in Damped Lyman-Alpha Systems and the Obscuration of Quasars. *S. Michael Fall and Yichuan C. Pei*. 337, 7, 17-B1 (1989)
- FERRARIO, LILIA. EXO 033319 - 2554.2: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. *Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough*. 337, 832, 29-C7 (1989)
- FEY, A. L. VLBI Angular Broadening Measurements in the Cygnus Region. *A. L. Fey, S. R. Spangler, and R. L. Mutel*. 337, 730, 28-B1 (1989)
- FIELDUS, MICHAEL S. Infrared Spectroscopy of Cepheids: Peculiar Velocity Structure and Its Effect on Radii and Distances. *Dimitar D. Sasselov, John B. Lester, and Michael S. Fieldus*. 337, L29, 25-C7 (1989)
- FISCHER, M. L. Anisotropy of the Diffuse Background at Millimeter Wavelengths. *G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk*. 337, L1, 25-A6 (1989)
- FOLTZ, CRAIG. A Spiral Galaxy at  $z = 0.366$  Which Overlaps the Image of the Quasar 4C 39.47. *Paul Hintzen, W. Romanishin, Craig Foltz, and William Keel*. 337, L5, 25-A10 (1989)
- FORREST, W. J. Near-Infrared Images of the Bipolar Nebula OH 0739 - 14. *C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure*. 337, 754, 28-D2 (1989)
- FREEMAN, K. C. The Optical and Near-Infrared Distribution of Light in the Edge-on Galaxy IC 2531. *R. J. Wainscoat, K. C. Freeman, and A. R. Hyland*. 337, 163, 19-C1 (1989)
- FRIEND, DAVID B. A Rotating, Magnetic, Radiation-driven Wind Model for Wolf-Rayet Stars. *Clint H. Poe, David B. Friend, and Joseph P. Cassinelli*. 337, 888, 30-A1 (1989)
- FRYE, G. Hard X-Ray Spectrum of Supernova 1987A on Day 407. *P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye*. 337, L19, 25-B11 (1989)
- FRYXELL, BRUCE A. Hebig-Haro Objects as the Heads of Radiative Jets. *John M. Blondin, Arieh Königl, and Bruce A. Fryxell*. 337, L37, 25-D1 (1989)
- FUKUGITA, M. Rotating Stellar Collapse Model for Supernova SN 1987A. *T. Nakamura and M. Fukugita*. 337, 466, 23-C8 (1989)
- Reaction Cross Section for "Solar Flare Neutrinos" with  $^{37}\text{Cl}$  and  $^{16}\text{O}$  Targets. *M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto*. 337, L59, 25-E11 (1989)
- FUKUI, YASUO. High-Resolution CO Observations of NGC 1068. *Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt*. 337, 691, 27-E7 (1989)
- GIRAUD, EDMOND. A Gravitational Lens Explanation for the Arclike Structure in Cl 0500 - 24. *Joachim Wambsgans, Edmond Giraud, Peter Schneider, and Achim Weiss*. 337, L73, 32-B5 (1989)
- GLASS, I. S. Hot Dust on the Outskirts of the Broad-Line Region in Fairall 9. *J. Clavel, W. Wamsteker, and I. S. Glass*. 337, 236, 20-C7 (1989)
- GOLDSMITH, P. F. Dust and Gas Emission in Barnard 5. *W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman*. 337, 355, 21-F10 (1989)
- GOLDSMITH, PAUL F. CO Isotope Studies of the Sagittarius B2 Molecular Cloud. *Dariusz C. Lis and Paul F. Goldsmith*. 337, 704, 27-F1 (1989)
- GONZÁLEZ, LUIS E. Calán-Tololo Survey. I. Seyfert 1 Galaxies (Abstract of Paper in 1989 March Suppl.). *José Maza, María Teresa Ruiz, Luis E. González, and Marina Wischniewsky*. 337, 1036, 31-E11 (1989)
- GOODE, PHILIP R. The Radial Gradient in the Sun's Rotation. *W. A. Dziembowski, Philip R. Goode, and K. G. Libbrecht*. 337, L53, 25-E5 (1989)
- GOODMAN, JEREMY. Black Holes or Dark Clusters in M31 and M32? *Jeremy Goodman and Hyung Mok Lee*. 337, 84, 18-B1 (1989)
- GORDON, M. A. Millimeter-Wave Recombination Lines from Radio-bright H II Regions. *M. A. Gordon*. 337, 782, 28-F5 (1989)
- GOSS, W. M. Aperture Synthesis Observations of the 21 Centimeter Zeeman Effect toward Orion A. *T. H. Troland, C. Heiles, and W. M. Goss*. 337, 342, 21-E9 (1989)
- GOULD, ROBERT J. Born-Approximation and Radiative Corrections to Pair Production in Photon-Photon Collisions. *Robert J. Gould*. 337, 950, 30-E11 (1989)
- GOUTTEBROZE, PIERRE. Solar Atmospheric Dynamics. III. The Effect of Acoustic Waves on the Mg II  $k$  Line Profile. *Pierre Gouttebroze*. 337, 536, 24-B12 (1989)
- GREEN, E. M. Population Studies. VI. The Transition from Halo to Thin Disk. *John E. Norris and E. M. Green*. 337, 272, 20-F9 (1989)
- GREEN, SHELTON. Collisional Rate Coefficients of  $\text{C}_2\text{H}_2$  and the Determination of Physical Conditions in Molecular Clouds. *L. W. Auer and Sheldon Green*. 337, 306, 21-B8 (1989)
- GREENHILL, L. J. VLBI and Polarimetric Observations of the SiO Masers

- in R Cassiopeiae. G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. Rogers, and R. Barvainis. 337, 934, 30-D9 (1989)
- GREGG, MICHAEL D. Differential Population Synthesis of S0 Galaxies. II. Methods and Results. Michael D. Gregg. 337, 45, 17-E1 (1989)
- GRINSTEIN, BENJAMIN. On the Validity of the Zel'dovich Approximation. Benjamin Grinstein and Mark B. Wise. 337, 579, 24-F5 (1989) (Orig. paper in 320, 448, 114-C11)
- GULLIXSON, CRAIG A. Optical and Infrared Surface Photometry of NGC 3077. Jill S. Price and Craig A. Gullixson. 337, 658, 27-B10 (1989)
- GUSTAFSON, BO A. S. Comet Ejection and Dynamics of Nonspherical Dust Particles and Meteoroids. Bo A. S. Gustafson. 337, 945, 30-E6 (1989)
- HARMON, J. K. Propagation Observations of the Solar Wind near the Sun. W. A. Coles and J. K. Harmon. 337, 1023, 31-D10 (1989)
- HARPER, D. A. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey. 337, 650, 27-B1 (1989)
- HARTMANN, L. Wind-Disk Shocks around T Tauri Stars. L. Hartmann and J. C. Raymond. 337, 903, 30-B6 (1989)
- HASINGER, G. A Third X-Ray Spectral Mode in Scorpius X-1: Similarities to the Other Bright Bulge Sources. G. Hasinger, W. C. Priedhorsky, and J. Middledich. 337, 843, 29-D4 (1989)
- HECKMAN, T. M. Multicolor Surface Photometry of Powerful Radio Galaxies. I. Observations and Data Reduction (Abstract of Paper in 1989 March Suppl.). Eric P. Smith and T. M. Heckman. 337, 1036, 31-E11 (1989)
- HEILES, C. Aperture Synthesis Observations of the 21 Centimeter Zeeman Effect toward Orion A. T. H. Troland, C. Heiles, and W. M. Goss. 337, 342, 21-E9 (1989)
- HEYER, MARK H. Comparison of the Far-Infrared and Carbon Monoxide Emission in Heiles' Cloud 2 and B18. Ronald L. Snell, Mark H. Heyer, and F. Peter Schloerb. 337, 739, 28-C1 (1989)
- HINTZEN, PAUL A. Spiral Galaxy at  $z = 0.366$  Which Overlaps the Image of the Quasar 4C 39.47. Paul Hintzen, W. Romanishin, Craig Foltz, and William Keel. 337, L5, 25-A10 (1989)
- HO, PAUL T. P. CO in Optically Selected Starburst Galaxies. James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett. 337, 680, 27-D10 (1989)
- HODGE, PAUL W. Properties of H II Region Populations in Galaxies. II. The H II Region Luminosity Function. Robert C. Kennicutt, Jr., B. Kevin Edgar, and Paul W. Hodge. 337, 761, 28-D10 (1989)
- HOGAN, C. J. Pressure-confined Lyman-Alpha Clouds. E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann. 337, 609, 26-F1 (1989)
- HOLLIS, J. M. RX Puppis: Detection of Asymmetrical Radio Structure. J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliveren, A. G. Michalitsianos, and M. Kafatos. 337, 514, 23-G9 (1989)
- The Outer R Aquarii Nebula: Comparison of 6 Centimeter Radio Continuum and Balmer Line Emission. J. M. Hollis, R. J. Oliveren, and R. Mark Wagner. 337, 795, 28-G4 (1989)
- HOUGH, J. H. EXO 033139 - 2554.2: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough. 337, 832, 29-C7 (1989)
- HOWARTH, IAN D. The Stellar Winds of 203 Galactic O Stars: A Quantitative Ultraviolet Survey (Abstract of Paper in 1989 March Suppl.). Ian D. Howarth and Raman K. Prinja. 337, 1037, 31-E12 (1989)
- HUGHES, JOHN P. The Mass of the Coma Cluster: Combined X-Ray and Optical Results. John P. Hughes. 337, 21, 17-C5 (1989)
- HYLAND, A. R. The Optical and Near-Infrared Distribution of Light in the Edge-on Galaxy IC 2531. R. J. Wainscoat, K. C. Freeman, and A. R. Hyland. 337, 163, 19-C1 (1989)
- IRVINE, NELSON J. HD 93521: A High-Latitude Shell Star. Nelson J. Irvine. 337, L33, 25-C11 (1989)
- IWATA, TAKAHIRO. High-Resolution CO Observations of NGC 1068. Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt. 337, 691, 27-E7 (1989)
- JACKSON, JAMES M. CO in Optically Selected Starburst Galaxies. James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett. 337, 680, 27-D10 (1989)
- JANES, KENNETH A. The Luminosity Scale of RR Lyrae Stars with the Baade-Wesselink Method. I. Photometry and Radial Velocities (Abstract of Paper in 1989 March Suppl.). Tianxing Liu and Kenneth A. Janes. 337, 1038, 31-E13 (1989)
- JIN, LIPING. Primordial Helium Production by Pregalactic Accreting Black Holes. Liping Jin. 337, 603, 26-E6 (1989)
- JOG, CHANDA J. The Velocity Dispersion of the Giant Molecular Clouds: A Viscous Origin: Erratum. Chanda J. Jog and Jeremiah P. Ostriker. 337, 1035, 31-E8 (1989) (Orig. paper in 328, 404, 67-D10)
- JORDANA, J. J. RDZ. Three-dimensional Morphological Segregation in Rich Clusters of Galaxies. E. Salvador-Solé, M. Sanrom, and J. J. Rdz. Jordana. 337, 636, 27-A1 (1989)
- KAastra, J. S. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. J. J. Klaas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock. 337, 399, 22-C6 (1989)
- KAFATOS, M. RX Puppis: Detection of Asymmetrical Radio Structure. J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliveren, A. G. Michalitsianos, and M. Kafatos. 337, 514, 23-G9 (1989)
- KAI, KEIZO. The Spatial, Spectral, and Temporal Character of the Hard X-Ray Flare of 1982 February 3. Nariaki Nitta, Alan L. Kiplinger, and Keizo Kai. 337, 1003, 31-C2 (1989)
- KAIFU, NORIO. High-Resolution CO Observations of NGC 1068. Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt. 337, 691, 27-E7 (1989)
- KALER, JAMES B. Apparent Magnitudes of Luminous Planetary Nebula Nuclei. II. A Survey of Southern Hemisphere Planetary Nebulae (Abstract of Paper in 1989 March Suppl.). Richard A. Shaw and James B. Kaler. 337, 1037, 31-E12 (1989)
- KANEKO, NOBORU. High-Resolution CO Observations of NGC 1068. Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt. 337, 691, 27-E7 (1989)
- KAWARA, KIMIaki. Brackett  $\alpha$  and  $\gamma$  Observations of Starburst and Seyfert Galaxies. Kimiaki Kawara, Minoru Nishida, and M. M. Phillips. 337, 230, 20-C1 (1989)
- KEEL, WILLIAM. A Spiral Galaxy at  $z = 0.366$  Which Overlaps the Image of the Quasar 4C 39.47. Paul Hintzen, W. Romanishin, Craig Foltz, and William Keel. 337, L5, 25-A10 (1989)
- KENNICUTT, ROBERT C., JR. Properties of H II Region Populations in Galaxies. II. The H II Region Luminosity Function. Robert C. Kennicutt, Jr., B. Kevin Edgar, and Paul W. Hodge. 337, 761, 28-D10 (1989)
- KIM, D.-W. Interstellar Matter in Early-Type Galaxies. III. Radio Emission and Star Formation. D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim. 337, 209, 19-G9 (1989)
- KIPLINGER, ALAN L. The Spatial, Spectral, and Temporal Character of the Hard X-Ray Flare of 1982 February 3. Nariaki Nitta, Alan L. Kiplinger, and Keizo Kai. 337, 1003, 31-C2 (1989)
- KITAMOTO, SHUNJI. Discovery of a Bright X-Ray Nova, GS 2000 + 25. Hiroshi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane Roussel-Dupré. 337, L81, 32-C1 (1989)
- KNAPP, G. R. Interstellar Matter in Early-Type Galaxies. III. Radio Emission and Star Formation. D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim. 337, 209, 19-G9 (1989)
- KOHYAMA, Y. Reaction Cross Section for "Solar Flare Neutrinos" with  $^{37}\text{Cl}$  and  $^{16}\text{O}$  Targets. M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto. 337, L59, 25-E11 (1989)
- KÖNIGL, ARIEH. Hebig-Haro Objects as the Heads of Radiative Jets. John M. Blondin, Arie König, and Bruce A. Fryxell. 337, L37, 25-D1 (1989)
- KOO, BON-CHUL. Extremely High-Velocity Molecular Flows in Young Stellar Objects. Bon-Chul Koo. 337, 318, 21-C8 (1989)
- KOO, DAVID C. Close Pairs of Galaxies in Deep Sky Surveys. Stephen E. Zepf and David C. Koo. 337, 34, 17-D6 (1989)
- KOVNER, ISRAEL. Diagnostics of Compact Clusters of Galaxies by Giant Luminous Arcs. Israel Kovner. 337, 621, 26-F14 (1989)
- KUBODERA, K. Reaction Cross Section for "Solar Flare Neutrinos" with  $^{37}\text{Cl}$  and  $^{16}\text{O}$  Targets. M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto. 337, L59, 25-E11 (1989)
- KUMAR, C. KRISHNA. The Accretion of Interplanetary Dust by Ap and Am Stars. C. Krishna Kumar, Joseph M. Davila, and R. Rajan Sundar. 337, 414, 22-D9 (1989)
- KURAMOTO, T. Reaction Cross Section for "Solar Flare Neutrinos" with  $^{37}\text{Cl}$  and  $^{16}\text{O}$  Targets. M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto. 337, L59, 25-E11 (1989)
- LAMERS, H. J. G. L. M. Fast Winds from the Central Stars of NGC 6543 and NGC 6826. M. Perinotto, M. Cerruti-Sola, and H. J. G. L. M. Lamers. 337, 382, 22-B1 (1989)
- LANGER, W. D. Dust and Gas Emission in Barnard 5. W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman. 337, 355, 21-F10 (1989)
- LEAN, J. L. Intermediate-Term Solar Periodicities: 100-500 Days. J. L. Lean and G. E. Brueckner. 337, 568, 24-E8 (1989)
- LEE, HYUNG MOK. Black Holes or Dark Clusters in M31 and M32?



- Jeremy Goodman and Hyung Mok Lee. 337, 84, 18-B1 (1989)
- LEIGHTON, R. B. Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- LESTER, JOHN B. Infrared Spectroscopy of Cepheids: Peculiar Velocity Structure and Its Effect on Radii and Distances. Dimitar D. Saselov, John B. Lester, and Michael S. Fieldus. 337, L29, 25-C7 (1989)
- LEUNG, CHUN MING. Using Far-Infrared Limb Brightening to Probe Isolated Dark Globules. Chun Ming Leung, Estela V. O'Brien, and Russell Dubisch. 337, 293, 21-A9 (1989)
- LIBBRECHT, K. G. The Radial Gradient in the Sun's Rotation. W. A. Dziembowski, Philip R. Goode, and K. G. Libbrecht. 337, L53, 25-E5 (1989)
- LIGHTMAN, ALAN P. Surfaces of Constant Redshift in an Inflationary Universe. Alan P. Lightman and William H. Press. 337, 598, 26-E1 (1989)
- LIN, D. N. C. Spectral Evolution of Accretion Disks of Dwarf Novae. II. Radiative Transfer Models. F. H. Cheng and D. N. C. Lin. 337, 432, 22-F1 (1989)
- LIS, DARIUSZ. CO Isotope Studies of the Sagittarius B2 Molecular Cloud. Dariusz C. Lis and Paul F. Goldsmith. 337, 704, 27-F1 (1989)
- LISZT, HARVEY S. High-Resolution CO Observations of NGC 1068. Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt. 337, 691, 27-E7 (1989)
- LIU, TIANXING. The Luminosity Scale of RR Lyrae Stars with the Baade-Wesselink Method. I. Photometry and Radial Velocities (Abstract of Paper in 1989 March Suppl.). Tianxing Liu and Kenneth A. Janes. 337, 1038, 31-E13 (1989)
- LOCHNER, JAMES C. A Search for a Dynamical Attractor in Cygnus X-1. James C. Lochner, J. H. Swank, and A. E. Szymkowiak. 337, 823, 29-B11 (1989)
- LOEWENSTEIN, R. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey. 337, 650, 27-B1 (1989)
- LOPES, DALTON F. The Chemical Composition of the Emitting Gas in HM Sagittae. J. A. De Freitas Pacheco, S. J. Codina-Landaberry, and Dalton F. Lopes. 337, 520, 24-A1 (1989)
- MAC LOW, MORDECAI-MARK. Superbubble Blowout Dynamics. Mordecai-Mark Mac Low, Richard McCray, and Michael L. Norman. 337, 141, 19-A1 (1989)
- MARR, J. M. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore. 337, 671, 27-D1 (1989)
- MASI, S. Infrared Emission from Interplanetary Dust. P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama. 337, 528, 24-B1 (1989)
- MASSEY, PHILIP. Spectroscopic Studies of Wolf-Rayet Stars. IV. Optical Spectrophotometry of the Emission Lines in Galactic and Large Magellanic Cloud Stars. Peter S. Conti and Philip Massey. 337, 251, 20-D12 (1989)
- MASSON, C. R. Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- MAZA, JOSÉ. Spectrophotometry of Calán-Tololo Seyfert Galaxies: Objects from List I (Abstract of Paper in 1989 March Suppl.). José Maza, María Teresa Ruiz, Luis E. González, and Marina Wischnjowsky. 337, 1036, 31-E11 (1989)
- MCCRAY, RICHARD. Superbubble Blowout Dynamics. Mordecai-Mark Mac Low, Richard McCray, and Michael L. Norman. 337, 141, 19-A1 (1989)
- MCINTOSH, G. C. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis. 337, 934, 30-D9 (1989)
- MÉSZÁROS, P. The Effect of Stimulated Scattering in Compact Sources. P. Mészáros, G. G. Pavlou, and Yu. A. Shibano. 337, 426, 22-E7 (1989)
- Magnetized Neutron Stars as Gamma-Ray Bursters: Detection Rates at High Energies. P. Mészáros, Z. Bagoly, and H. Riffert. 337, L23, 25-C1 (1989)
- MEWALDT, R. A. Isotope Abundances of Solar Coronal Material Derived from Solar Energetic Particle Measurements. R. A. Mewaldt and E. C. Stone. 337, 959, 30-F6 (1989)
- MICHALITSIANOS, A. G. RX Puppis: Detection of Asymmetrical Radio Structure. J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliver, A. G. Michalitsianos, and M. Kafatos. 337, 514, 23-G9 (1989)
- MIDDLEDITCH, J. A Third X-Ray Spectral Mode in Scorpius X-1: Similarities to the Other Bright Bulge Sources. G. Hasinger, W. C. Priedhorsky, and J. Middleditch. 337, 843, 29-D4 (1989)
- MILGROM, MORDEHAI. Light Reprocessing in the Echo Model of Luminous Arcs. Erez Braun and Mordehai Milgrom. 337, 644, 27-A9 (1989)
- MIRABEL, I. FÉLIX. VLA Observations of the High-Velocity Bipolar OH Absorption in L1551. Luis F. Rodríguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz. 337, 712, 27-G1 (1989)
- MOFFAT, ANTHONY F. J. Slow Expansion of the Shell of the Recurrent Nova T Pyxidis and Detection of a Faint Extended Envelope. Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen. 337, 720, 28-A1 (1989)
- MONETI, A. Near-Infrared Images of the Bipolar Nebula OH 0739 - 14. C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure. 337, 754, 28-D2 (1989)
- MONTESSINOS, BENJAMIN. Siphon Flows in Isolated Magnetic Flux Tubes. II. Adiabatic Flows. Benjamin Montesinos and John H. Thomas. 337, 977, 31-A1 (1989)
- MOORE, R. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore. 337, 671, 27-D1 (1989)
- MORAN, J. M. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis. 337, 934, 30-D9 (1989)
- MORENO, G. Infrared Emission from Interplanetary Dust. P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama. 337, 528, 24-B1 (1989)
- MORITA, KAZUHIKO. High-Resolution CO Observations of NGC 1068. Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt. 337, 691, 27-E7 (1989)
- MULLAN, D. J. g-Mode Pulsations in Polytropes: High-Precision Eigenvalues and the Approach to Asymptotic Behavior. D. J. Mullan. 337, 1017, 31-D4 (1989)
- MUNDY, L. G. Interferometric Observations of 1.4 Millimeter Continuum Sources. D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson. 337, L41, 25-D5 (1989)
- Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- MUSIELAK, Z. E. On the Generation of Flux Tube Waves in Stellar Convection Zones. I. Longitudinal Tube Waves Driven by External Turbulence. Z. E. Musielak, R. Rosner, and P. Ulmschneider. 337, 470, 23-D1 (1989)
- MUTEL, R. L. VLBI Angular Broadening Measurements in the Cygnus Region. A. L. Fey, S. R. Spangler, and R. L. Mutel. 337, 730, 28-B1 (1989)
- NAKAI, NAOMASA. High-Resolution CO Observations of NGC 1068. Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt. 337, 691, 27-E7 (1989)
- NAKAMURA, T. Rotating Stellar Collapse Model for Supernova SN 1987A. T. Nakamura and M. Fukugita. 337, 466, 23-C8 (1989)
- NATH, BIMAN B. On the Explosive Origin Hypothesis for Present-Day Cosmic Voids and Peculiar Velocities. Biman B. Nath and David Eichler. 337, 1, 17-A9 (1989)
- NISHIDA, MINORU. Brackett  $\alpha$  and  $\gamma$  Observations of Starburst and Seyfert Galaxies. Kimiaki Kawara, Minoru Nishida, and M. M. Phillips. 337, 230, 20-C1 (1989)
- NITTA, NARIAKI. The Spatial, Spectral, and Temporal Character of the Hard X-Ray Flare of 1982 February 3. Nariaki Nitta, Alan L. Kiplinger, and Keizo Kai. 337, 1003, 31-C2 (1989)
- NORMAN, MICHAEL L. Superbubble Blowout Dynamics. Mordecai-Mark Mac Low, Richard McCray, and Michael L. Norman. 337, 141, 19-A1 (1989)
- NORRIS, JOHN E. Population Studies. VI. The Transition from Halo to Thin Disk. John E. Norris and E. M. Green. 337, 272, 20-F9 (1989)
- O'BRIEN, ESTELA V. Using Far-Infrared Limb Brightening to Probe Isolated Dark Globules. Chun Ming Leung, Estela V. O'Brien, and Russell Dubisch. 337, 293, 21-A9 (1989)
- OKAMURA, SADANORI. Discovery of a Bright X-Ray Nova, GS 2000 + 25. Hiroshi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane Roussel-Dupré. 337, L81, 32-C1 (1989)
- OLIVERSEN, R. J. RX Puppis: Detection of Asymmetrical Radio Struc-

- ture. J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliveren, A. G. Michalitsianos, and M. Kafatos. 337, 514, 23-G9 (1989)
- The Outer R Aquarii Nebula: Comparison of 6 Centimeter Radio Continuum and Balmer Line Emission. J. M. Hollis, R. J. Oliveren, and R. Mark Wagner. 337, 795, 28-G4 (1989)
- OLIVI, FABRIZIO M. Models of Spectral Energy Distributions of Elliptical Galaxies. Guido Barbaro and Fabrizio M. Olivi. 337, 125, 18-F6 (1989)
- OSTRIKER, JEREMIAH P. The Velocity Dispersion of the Giant Molecular Clouds: A Viscous Origin: Erratum. Chanda J. Jog and Jeremiah P. Ostriker. 337, 1035, 31-E8 (1989) (Orig. paper in 328, 404, 67-D10)
- PACZYŃSKI, BOHDAN. Gravitational Lensing by a Smoothly Variable Surface Mass Density. Bohdan Paczyński and Joachim Wambsganss. 337, 581, 26-C1 (1989)
- PADIN, S. Interferometric Observations of 1.4 Millimeter Continuum Sources. D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson. 337, L41, 25-D5 (1989)
- Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- PARESCE, FRANCESCO. The Structure of the Beta Pictoris Circumstellar Disk From Combined IRAS and Coronagraphic Observations. Paweł Artymowicz, Christopher Burrows, and Francesco Paresce. 337, 494, 23-F1 (1989)
- High-Resolution Coronagraphy of the Circumstellar Environment of SN 1987A. Francesco Paresce and Christopher Burrows. 337, L13, 25-B6 (1989)
- PARK, SEOK JAE. An Axisymmetric, Nonstationary Model of the Central Engine in an Active Galactic Nucleus. I. Black Hole Electrodynamics. Seok Jae Park and Ethan T. Vishniac. 337, 78, 18-A7 (1989)
- PAVLOV, G. G. The Effect of Stimulated Scattering in Compact Sources. P. Mészáros, G. G. Pavlov, and Yu. A. Shibano. 337, 426, 22-E7 (1989)
- PEACOCK, A. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock. 337, 399, 22-C6 (1989)
- PEI, YICHUAN C. Limits on Dust in Damped Lyman-Alpha Systems and the Obscuration of Quasars. S. Michael Fall and Yichuan C. Pei. 337, 7, 17-B1 (1989)
- PELLAT, R. Bars and Barred Spirals: Linear Theory Revisited. M. Tagger, J. F. Sygnet, and R. Pellat. 337, L9, 25-B1 (1989)
- PERINOTTO, M. Fast Winds from the Central Stars of NGC 6543 and NGC 6826. M. Perinotto, M. Cerruti-Sola, and H. J. G. L. M. Lamers. 337, 382, 22-B1 (1989)
- PERNIC, R. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey. 337, 650, 27-B1 (1989)
- PETERSON, J. B. Anisotropy of the Diffuse Background at Millimeter Wavelengths. G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk. 337, L1, 25-A6 (1989)
- PETROSIAN, VAHÉ. Cosmological Parameters and Evolution of the Galaxy Luminosity Function. David Caditz and Vahé Petrosian. 337, L65, 32-A10 (1989)
- PHILLIPS, M. M. Brackett  $\alpha$  and  $\gamma$  Observations of Starburst and Seyfert Galaxies. Kimiaki Kawara, Minoru Nishida, and M. M. Phillips. 337, 230, 20-C1 (1989)
- PIPKER, J. L. Near-Infrared Images of the Bipolar Nebula OH 0739 - 14. C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure. 337, 754, 28-D2 (1989)
- PLATT, S. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey. 337, 650, 27-B1 (1989)
- Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey. 337, 650, 27-B1 (1989)
- POE, CLINT H. A Rotating, Magnetic, Radiation-driven Wind Model for Wolf-Rayet Stars. Clint H. Poe, David B. Friend, and Joseph P. Cassinelli. 337, 888, 30-A1 (1989)
- PRASAD, C. V. V. The First Negative ( $B^2\Sigma^+ - X^2\Sigma^+$ ) System of  $^{15}N_2^+$ . S. Paddi Reddi and C. V. V. Prasad. 337, 579, 24-F5 (1989) (Orig. paper in 331, 572, 112-F8)
- PREDMORE, C. R. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis. 337, 934, 30-D9 (1989)
- PRESS, WILLIAM H. Surfaces of Constant Redshift in an Inflationary Universe. Alan P. Lightman and William H. Press. 337, 598, 26-E1 (1989)
- PRICE, JILL S. Optical and Infrared Surface Photometry of NGC 3077. Jill S. Price and Craig A. Gullixson. 337, 658, 27-B10 (1989)
- RIEDHORSKY, W. C. A Third X-Ray Spectral Mode in Scorpius X-1: Similarities to the Other Bright Bulge Sources. G. Hasinger, W. C. Riedhorsky, and J. Middledich. 337, 843, 29-D4 (1989)
- PRINJA, RAMAN K. The Stellar Winds of 203 Galactic O Stars: A Quantitative Ultraviolet Survey (Abstract of Paper in 1989 March Suppl.). Ian D. Howarth and Raman K. Prinja. 337, 1037, 31-E12 (1989)
- RAYMOND, J. C. Wind-Disk Shocks around T Tauri Stars. L. Hartmann and J. C. Raymond. 337, 903, 30-B6 (1989)
- READHEAD, A. C. S. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore. 337, 671, 27-D1 (1989)
- REDDI, S. PADDI. The First Negative ( $B^2\Sigma^+ - X^2\Sigma^+$ ) System of  $^{15}N_2^+$ . S. Paddi Reddi and C. V. V. Prasad. 337, 579, 24-F5 (1989) (Orig. paper in 331, 572, 112-F8)
- RICHARDS, P. L. Anisotropy of the Diffuse Background at Millimeter Wavelengths. G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk. 337, L1, 25-A6 (1989)
- RIFFERT, H. Magnetized Neutron Stars as Gamma-Ray Bursters: Detection Rates at High Energies. P. Mészáros, Z. Bagoly, and H. Riffert. 337, L23, 25-C1 (1989)
- RODRIGUEZ, LUIS F. VLA Observations of the High-Velocity Bipolar OH Absorption in L1551. Luis F. Rodriguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz. 337, 712, 27-G1 (1989)
- ROGERS, A. E. E. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis. 337, 934, 30-D9 (1989)
- ROMANISHIN, W. A. Spiral Galaxy at  $z = 0.366$  Which Overlaps the Image of the Quasar 4C 39.47. Paul Hintzen, W. Romanishin, Craig Foltz, and William Keel. 337, L5, 25-A10 (1989)
- ROSE, WILLIAM K. Magnetic Fields in Extragalactic Jets. II. Specific Models and Radiative Processes. William K. Rose. 337, 91, 18-B12 (1989)
- ROSNER, R. On the Generation of Flux Tube Waves in Stellar Convection Zones. I. Longitudinal Tube Waves Driven by External Turbulence. Z. E. Musielak, R. Rosner, and P. Ulmschneider. 337, 470, 23-D1 (1989)
- ROUSSEL-DUPRÉ, DIANE. Discovery of a Bright X-Ray Nova, GS 2000 + 25. Hiroshi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane Roussel-Dupré. 337, L81, 32-C1 (1989)
- RUDERMAN, MALVIN. Period Difference between X-Ray and Very High Energy Gamma-Ray Observations of Accreting X-Ray Pulsars. K. S. Cheng and Malvin Ruderman. 337, L77, 32-B10 (1989)
- RUIZ, ABRAHAM. VLA Observations of the High-Velocity Bipolar OH Absorption in L1551. Luis F. Rodriguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz. 337, 712, 27-G1 (1989)
- RUIZ, MARIA TERESA. Spectrophotometry of Calán-Tololo Seyfert Galaxies: Objects from List 1 (Abstract of Paper in 1989 March Suppl.). José Maza and Maria Teresa Ruiz. 337, 1036, 31-E11 (1989)
- Calán-Tololo Survey. I. Seyfert 1 Galaxies (Abstract of Paper in 1989 March Suppl.). José Maza, Maria Teresa Ruiz, Luis E. González, and Marina Wischnjowsky. 337, 1036, 31-E11 (1989)
- RUPEN, MICHAEL R. VLBI Observations of SN 1986J: Deviations from Spherical Symmetry in Its Radio Brightness Distribution. Norbert Bartel, Michael R. Rupen, and Irwin I. Shapiro. 337, L85, 32-C7 (1989)
- RYU, DONGSU. On the Stability of Decelerating Shocks. Ethan T. Vishniac and Dongsu Ryu. 337, 917, 30-C6 (1989)
- SAAR, S. H. Relations between the Photospheric Magnetic Field and the Emission from the Outer Atmospheres of Cool Stars. I. The Solar Ca II K Line Core Emission. C. J. Schrijver, J. Coté, C. Zwaan, and S. H. Saar. 337, 964, 30-F12 (1989)
- SALAMA, A. Infrared Emission from Interplanetary Dust. P. Tenti, P. De Bernardis, S. Masi, G. Moreno, and A. Salama. 337, 528, 24-B1 (1989)
- SALVADOR-SOLÉ, E. Three-dimensional Morphological Segregation in Rich Clusters of Galaxies. E. Salvador-Solé, M. Sanrom, and J. J. Rdz. Jordana. 337, 636, 27-A1 (1989)
- SANROM, M. Three-dimensional Morphological Segregation in Rich Clusters of Galaxies. E. Salvador-Solé, M. Sanrom, and J. J. Rdz. Jordana. 337, 636, 27-A1 (1989)
- SANTOS, N. O. Density Constraints on Local Inhomogeneity in Cosmology. J. Eisenstaedt and N. O. Santos. 337, 601, 26-E4 (1989)
- SARGENT, A. I. Interferometric Observations of 1.4 Millimeter Continuum Sources. D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy,

- A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson. 337, L41, 25-D5 (1989)
- Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- SASSELOV, DIMITAR D. Infrared Spectroscopy of Cepheids: Peculiar Velocity Structure and Its Effect on Radii and Distances. Dimitar D. Sasellov, John B. Lester, and Michael S. Fieldus. 337, L29, 25-C7 (1989)
- SCHAEFER, BRADLEY E. Flashes from Normal Stars. Bradley E. Schaefer. 337, 927, 30-D2 (1989)
- SCHLOERB, F. PETER. Comparison of the Far-Infrared and Carbon Monoxide Emission in Heiles' Cloud 2 and B18. Ronald L. Snell, Mark H. Heyer, and F. Peter Schloerb. 337, 739, 28-C1 (1989)
- SCHNEIDER, PETER. A Gravitational Lens Explanation for the Arclike Structure in CI 0500 - 24. Joachim Wambsgans, Edmond Giraud, Peter Schneider, and Achim Weiss. 337, L73, 32-B5 (1989)
- SCHRIJVER, C. J. Relations between the Photospheric Magnetic Field and the Emission from the Outer Atmospheres of Cool Stars. I. The Solar Ca II K Line Core Emission. C. J. Schrijver, J. Côté, C. Zwaan, and S. H. Saar. 337, 964, 30-F12 (1989)
- SCHULTE-LADBECK, REGINA E. Polarimetry of Four Wolf-Rayet Stars. Regina E. Schulte-Ladbeck and Karel A. van der Hucht. 337, 872, 29-F10 (1989)
- SCOTT, S. L. Interferometric Observations of 1.4 Millimeter Continuum Sources. D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson. 337, L41, 25-D5 (1989)
- Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- SCOVILLE, N. Z. Interferometric Observations of 1.4 Millimeter Continuum Sources. D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson. 337, L41, 25-D5 (1989)
- Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- SELING, T. V. Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- SHAPIRO, IRWIN I. VLBI Observations of SN 1986J: Deviations from Spherical Symmetry in Its Radio Brightness Distribution. Norbert Bartel, Michael R. Rupen, and Irwin I. Shapiro. 337, L85, 32-C7 (1989)
- SHAPIRO, STUART L. Supernova 1987A and the Emergence of the Hot Neutron Star: A Semianalytic Approach. David F. Chernoff, Stuart L. Shapiro, and Ira Wasserman. 337, 814, 29-B1 (1989)
- SHARA, MICHAEL M. Slow Expansion of the Shell of the Recurrent Nova T Pyxidis and Detection of a Faint Extended Envelope. Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen. 337, 720, 28-A1 (1989)
- SHAW, RICHARD A. Apparent Magnitudes of Luminous Planetary Nebula Nuclei. II. A Survey of Southern Hemisphere Planetary Nebulae (Abstract of Paper in 1989 March Suppl.). Richard A. Shaw and James B. Kaler. 337, 1037, 31-E12 (1989)
- SHIBANOV, YU. A. The Effect of Stimulated Scattering in Compact Sources. P. Mézardos, G. G. Pavlov, and Yu. A. Shibarov. 337, 426, 22-E7 (1989)
- SHURE, M. A. Near-Infrared Images of the Bipolar Nebula OH 0739 - 14. C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure. 337, 754, 28-D2 (1989)
- SIKORA, MAREK. Self-absorbed Synchrotron Sources in Active Galactic Nuclei. Martijn de Kool, Mitchell C. Begelman, and Marek Sikora. 337, 66, 17-G5 (1989)
- SIMON, M. Lunar Occultations of IRAS Point Sources, 1991-2000 (Abstract of Paper in 1989 March Suppl.). L. Cassar, W. P. Chen, and M. Simon. 337, 1038, 31-E13 (1989)
- SMITH, A. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock. 337, 399, 22-C6 (1989)
- SMITH, DEAN F. Minimum Mach Number for Impulsive Proton Acceleration by Parallel Collisionless Shock Waves in Solar Flares. Dean F. Smith and Stephen H. Brecht. 337, 954, 30-F1 (1989)
- SMITH, ERIC P. Multicolor Surface Photometry of Powerful Radio Galaxies. I. Observations and Data Reduction (Abstract of Paper in 1989 March Suppl.). Eric P. Smith and T. M. Heckman. 337, 1036, 31-E11 (1989)
- SNELL, RONALD L. CO in Optically Selected Starburst Galaxies. James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett. 337, 680, 27-D10 (1989)
- Comparison of the Far-Infrared and Carbon Monoxide Emission in Heiles' Cloud 2 and B18. Ronald L. Snell, Mark H. Heyer, and F. Peter Schloerb. 337, 739, 28-C1 (1989)
- SOOD, R. Hard X-Ray Spectrum of Supernova 1987A on Day 407. P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye. 337, L19, 25-B11 (1989)
- SPANGLER, S. R. VLBI Angular Broadening Measurements in the Cygnus Region. A. L. Fey, S. R. Spangler, and R. L. Mutel. 337, 730, 28-B1 (1989)
- STAPLEFELDT, K. R. Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- STARK, A. A. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey. 337, 650, 27-B1 (1989)
- STAUBERT, R. Hard X-Ray Spectrum of Supernova 1987A on Day 407. P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye. 337, L19, 25-B11 (1989)
- STENCEL, ROBERT E. Line Identifications in the Ultraviolet Spectrum of 31 Cygni (Abstract of Paper in 1989 March Suppl.). Wendy Hagen Bauer and Robert E. Stencel. 337, 1038, 31-E13 (1989)
- STONE, E. C. Isotope Abundances of Solar Coronal Material Derived from Solar Energetic Particle Measurements. R. A. Mewaldt and E. C. Stone. 337, 959, 30-F6 (1989)
- SUESS, S. T. Magneto-hydrodynamic Instabilities in Coronal Arcades. Chang-Hyuk An, S. T. Suess, and S. T. Wu. 337, 989, 31-B1 (1989)
- SUGITANI, KOJI. High-Resolution CO Observations of NGC 1068. Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt. 337, 691, 27-E7 (1989)
- SUMNER, T. J. Hard X-Ray Spectrum of Supernova 1987A on Day 407. P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye. 337, L19, 25-B11 (1989)
- SUNDAR, R. RAJAN. The Accretion of Interplanetary Dust by Ap and Am Stars. C. Krishna Kumar, Joseph M. Davila, and R. Rajan Sundar. 337, 414, 22-D9 (1989)
- SWANK, J. H. A Search for a Dynamical Attractor in Cygnus X-1. James C. Lochner, J. H. Swank, and A. E. Szymkowiak. 337, 823, 29-B11 (1989)
- SYGNET, J. F. Bars and Barred Spirals: Linear Theory Revisited. M. Tagger, J. F. Sygnet, and R. Pellat. 337, L9, 25-B1 (1989)
- SZYMKOWIAK, A. E. A Search for a Dynamical Attractor in Cygnus X-1. James C. Lochner, J. H. Swank, and A. E. Szymkowiak. 337, 823, 29-B11 (1989)
- TAAM, RONALD E. Double-Core Evolution. III. The Evolution of a  $5 M_{\odot}$  Red Giant with a  $1 M_{\odot}$  Companion. Ronald E. Taam and Peter Bodenheimer. 337, 849, 29-E1 (1989)
- TAGGER, M. Bars and Barred Spirals: Linear Theory Revisited. M. Tagger, J. F. Sygnet, and R. Pellat. 337, L9, 25-B1 (1989)
- TEMI, P. Infrared Emission from Interplanetary Dust. P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama. 337, 528, 24-B1 (1989)
- TEREBEY, S. Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey. 337, L45, 25-D9 (1989)
- THOMAS, JOHN H. Siphon Flows in Isolated Magnetic Flux Tubes. II. Adiabatic Flows. Benjamin Montesinos and John H. Thomas. 337, 977, 31-A1 (1989)
- TIMUSK, T. Anisotropy of the Diffuse Background at Millimeter Wavelengths. G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk. 337, L1, 25-A6 (1989)
- TINNEY, C. G. Interferometric Observations of 1.4 Millimeter Continuum Sources. D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson. 337, L41, 25-D5 (1989)
- TROLAND, T. H. Aperture Synthesis Observations of the 21 Centimeter Zeeman Effect toward Orion A. T. H. Troland, C. Heiles, and W. M. Goss. 337, 342, 21-E9 (1989)
- TSUNEMI, HIROSHI. Discovery of a Bright X-Ray Nova, GS 2000 + 25. Hiroshi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane



- Roussel-Dupré. 337, L81, 32-C1 (1989)
- TUOHY, I. R. EXO 033319 – 2554.2: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. *Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough.* 337, 832, 29-C7 (1989)
- UBERTINI, P. Hard X-Ray Spectrum of Supernova 1987A on Day 407. *P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye.* 337, L19, 25-B11 (1989)
- ULMSCHNEIDER, P. On the Generation of Flux Tube Waves in Stellar Convection Zones. I. Longitudinal Tube Waves Driven by External Turbulence. *Z. E. Musielak, R. Rosner, and P. Ulmschneider.* 337, 470, 23-D1 (1989)
- VAN DER HUCHT, KAREL A. Polarimetry of Four Wolf-Rayet Stars. *Regina E. Schulte-Ladbeck and Karel A. van der Hucht.* 337, 872, 29-F10 (1989)
- VISHNIAC, ETHAN T. An Axisymmetric, Nonstationary Model of the Central Engine in an Active Galactic Nucleus. I. Black Hole Electrodynamics. *Seok Jae Park and Ethan T. Vishniac.* 337, 78, 18-A7 (1989)
- On the Stability of Decelerating Shocks. *Ethan T. Vishniac and Dongsu Ryu.* 337, 917, 30-C6 (1989)
- VOGEL, S. N. Millimeter Continuum Observations of a Massive Protostellar Core in Sagittarius B2. *J. E. Carlstrom and S. N. Vogel.* 337, 408, 22-D3 (1989)
- WAGNER, R. MARK. The Outer R Aquarii Nebula: Comparison of 6 Centimeter Radio Continuum and Balmer Line Emission. *J. M. Hollis, R. J. Oliveren, and R. Mark Wagner.* 337, 795, 28-G4 (1989)
- WAINSCOAT, R. J. The Optical and Near-Infrared Distribution of Light in the Edge-on Galaxy IC 2531. *R. J. Wainscoat, K. C. Freeman, and A. R. Hyland.* 337, 163, 19-C1 (1989)
- WALSH, D. E. P. Interstellar Matter in Early-Type Galaxies. III. Radio Emission and Star Formation. *D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim.* 337, 209, 19-G9 (1989)
- WAMBSGANS, JOACHIM. Gravitational Lensing by a Smoothly Variable Surface Mass Density. *Bohdan Paczyński and Joachim Wambsgans.* 337, 581, 26-C1 (1989)
- A Gravitational Lens Explanation for the Arclike Structure in Cl 0500 – 24. *Joachim Wambsgans, Edmond Giraud, Peter Schneider, and Achim Weiss.* 337, L73, 32-B5 (1989)
- WAMSTEKER, W. Hot Dust on the Outskirts of the Broad-Line Region in Fairall 9. *J. Clavel, W. Wamstecker, and I. S. Glass.* 337, 236, 20-C7 (1989)
- WASSERMAN, IRA. Supernova 1987A and the Emergence of the Hot Neutron Star: A Semianalytic Approach. *David F. Chernoff, Stuart L. Shapiro, and Ira Wasserman.* 337, 814, 29-B1 (1989)
- WEISS, ACHIM. A Gravitational Lens Explanation for the Arclike Structure in Cl 0500 – 24. *Joachim Wambsgans, Edmond Giraud, Peter Schneider, and Achim Weiss.* 337, L73, 32-B5 (1989)
- WEYMANN, R. J. Pressure-confined Lyman-Alpha Clouds. *E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann.* 337, 609, 26-F1 (1989)
- WICKRAMASINGHE, D. T. EXO 033319 – 2554.2: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. *Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough.* 337, 832, 29-C7 (1989)
- WILLIAMS, ROBERT E. Slow Expansion of the Shell of the Recurrent Nova T Pyxidis and Detection of a Faint Extended Envelope. *Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen.* 337, 720, 28-A1 (1989)
- WILSON, C. D. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- WILSON, R. W. Dust and Gas Emission in Barnard 5. *W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman.* 337, 355, 21-F10 (1989)
- WISCHNIEWSKY, MARINA. Calán-Tololo Survey. I. Seyfert 1 Galaxies (Abstract of Paper in 1989 March Suppl.). *José Maza, Maria Teresa Ruiz, Luis E. González, and Marina Wischniewsky.* 337, 1036, 31-E11 (1989)
- WISE, MARK B. On the Validity of the Zel'dovich Approximation. *Benjamin Grinstein and Mark B. Wise.* 337, 579, 24-F5 (1989) (Original paper in 320, 448, 114-C11)
- WITHBROE, GEORGE L. The Solar Wind Mass Flux. *George L. Withbroe.* 337, L49, 25-E1 (1989)
- WOOD, K. S. Further Observations of the Eclipsing X-Ray Burst Source MXB 1659 – 29. *L. R. Cominsky and K. S. Wood.* 337, 485, 23-E4 (1989)
- WOODWARD, C. E. Near-Infrared Images of the Bipolar Nebula OH 0739 – 14. *C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure.* 337, 754, 28-D2 (1989)
- WOODY, D. P. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- Interferometric  $C^{18}O$  Observations of DR 21(OH) and L1551 IRS 5 at  $\gamma = 1.4$  Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- WOOTEN, ALWYN. The Duplicity of IRAS 16293 – 2422: A Protobinary Star? *Alwyn Wooten.* 337, 858, 29-E10 (1989)
- WRIGHT, M. C. H. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. *J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore.* 337, 671, 27-D1 (1989)
- WROBEL, J. M. Interstellar Matter in Early-Type Galaxies. III. Radio Emission and Star Formation. *D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim.* 337, 209, 19-G9 (1989)
- WU, S. T. Magnetohydrodynamic Instabilities in Coronal Arcades. *Chang-Hyuk An, S. T. Suess, and S. T. Wu.* 337, 989, 31-B1 (1989)
- YUSEF-ZADEH, F. RX Puppis: Detection of Asymmetrical Radio Structure. *J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliveren, A. G. Michalitsianos, and M. Kafatos.* 337, 514, 23-G9 (1989)
- ZEFF, STEPHEN E. Close Pairs of Galaxies in Deep Sky Surveys. *Stephen E. Zeff and David C. Koo.* 337, 34, 17-D6 (1989)
- ZHENG, WEI. Ionization by Line Photons and Its Effect on Hydrogen Line Ratios. *Wei Zheng.* 337, 617, 26-F9 (1989)
- ZMUIDZINAS, J. Heterodyne Spectroscopy of the  $J = 17-16$  CO Line in Orion. *R. T. Boreiko, A. L. Betz, and J. Zmuidzinas.* 337, 332, 21-D11 (1989)
- ZWAAN, C. Relations between the Photospheric Magnetic Field and the Emission from the Outer Atmospheres of Cool Stars. I. The Solar Ca II K Line Core Emission. *C. J. Schrijver, J. Coté, C. Zwaan, and S. H. Saar.* 337, 964, 30-F12 (1989)

L

7

9

11



THE ASTROPHYSICAL JOURNAL  
CONTENTS OF VOLUME 337, PART 1

1989 FEBRUARY 1, Number 1

	Page	Fiche
ON THE EXPLOSIVE ORIGIN HYPOTHESIS FOR PRESENT-DAY COSMIC VOIDS AND PECULIAR VELOCITIES <i>Biman B. Nath and David Eichler</i>	1	17-A9
LIMITS ON DUST IN DAMPED LYMAN-ALPHA SYSTEMS AND THE OBSCURATION OF QUASARS <i>S. Michael Fall and Yichuan C. Pei</i>	7	17-B1
THE MASS OF THE COMA CLUSTER: COMBINED X-RAY AND OPTICAL RESULTS ..... <i>John P. Hughes</i>	21	17-C5
CLOSE PAIRS OF GALAXIES IN DEEP SKY SURVEYS ..... <i>Stephen E. Zepf and David C. Koo</i>	34	17-D6
DIFFERENTIAL POPULATION SYNTHESIS OF S0 GALAXIES. II. METHODS AND RESULTS ..... <i>Michael D. Gregg</i>	45	17-E7
SELF-ABSORBED SYNCHROTRON SOURCES IN ACTIVE GALACTIC NUCLEI <i>Martijn de Kool, Mitchell C. Begelman, and Marek Sikora</i>	66	17-G5
AN AXISYMMETRIC, NONSTATIONARY MODEL OF THE CENTRAL ENGINE IN AN ACTIVE GALACTIC NUCLEUS. I. BLACK HOLE ELECTRODYNAMICS ..... <i>Seok Jae Park and Ethan T. Vishniac</i>	78	18-A7
BLACK HOLES OR DARK CLUSTERS IN M31 AND M32? ..... <i>Jeremy Goodman and Hyung Mok Lee</i>	84	18-B1
MAGNETIC FIELDS IN EXTRAGALACTIC JETS. II. SPECIFIC MODELS AND RADIATIVE PROCESSES .... <i>William K. Rose</i>	91	18-B12
THE EFFECTS OF MAGNETIC FIELDS ON THE GROWTH OF THERMAL INSTABILITIES IN COOLING FLOWS <i>Laurence P. David and Joel N. Bregman</i>	97	18-C4
PERIODIC ORBITS IN THE SCHWARZSCHILD GALACTIC POTENTIAL ..... <i>Paul W. Cleary</i>	108	18-D5
MODELS OF SPECTRAL ENERGY DISTRIBUTIONS OF ELLIPTICAL GALAXIES ..... <i>Guido Barbaro and Fabrizio M. Olivi</i>	125	18-F6
SUPERBUBBLE BLOWOUT DYNAMICS ..... <i>Mordecai-Mark Mac Low, Richard McCray, and Michael L. Norman</i>	141	19-A1
ON THE DETERMINATION OF DISTRIBUTION FUNCTIONS BY NUMERICAL METHODS ..... <i>Jeffrey L. Bishop</i>	155	19-B4
THE OPTICAL AND NEAR-INFRARED DISTRIBUTION OF LIGHT IN THE EDGE-ON GALAXY IC 2531 <i>R. J. Wainscoat, K. C. Freeman, and A. R. Hyland</i>	163	19-C1
HIGH-RESOLUTION NEUTRAL HYDROGEN OBSERVATIONS: THE BARRED SPIRAL GALAXY NGC 1300 <i>Martin N. England</i>	191	19-F1
INTERSTELLAR MATTER IN EARLY-TYPE GALAXIES. III. RADIO EMISSION AND STAR FORMATION <i>D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim</i>	209	19-G9
BRACKETT $\alpha$ AND $\gamma$ OBSERVATIONS OF STARBURST AND SEYFERT GALAXIES <i>Kimiaki Kawara, Minoru Nishida, and M. M. Phillips</i>	230	20-C1
HOT DUST ON THE OUTSKIRTS OF THE BROAD-LINE REGION IN FAIRALL 9 ..... <i>J. Clavel, W. Wamsteker, and I. S. Glass</i>	236	20-C7
SPECTROSCOPIC STUDIES OF WOLF-RAYET STARS. IV. OPTICAL SPECTROPHOTOMETRY OF THE EMISSION LINES IN GALACTIC AND LARGE MAGELLANIC CLOUD STARS ..... <i>Peter S. Conti and Phillip Massey</i>	251	20-D12
POPULATION STUDIES. VI. THE TRANSITION FROM HALO TO THIN DISK ..... <i>John E. Norris and E. M. Green</i>	272	20-F9
USING FAR-INFRARED LIMB BRIGHTENING TO PROBE ISOLATED DARK GLOBULES <i>Chun Ming Leung, Estela V. O'Brien, and Russell Dubisch</i>	293	21-A9
COLLISIONAL RATE COEFFICIENTS OF $C_3H_2$ AND THE DETERMINATION OF PHYSICAL CONDITIONS IN MOLECULAR CLOUDS ..... <i>L. W. Avery and Sheldon Green</i>	306	21-B8

	Page	Fiche
EXTREMELY HIGH-VELOCITY MOLECULAR FLOWS IN YOUNG STELLAR OBJECTS..... <i>Bon-Chul Koo</i>	318	21-C8
HETERODYNE SPECTROSCOPY OF THE $J=17-16$ CO LINE IN ORION ..... <i>R. T. Boreiko, A. L. Betz, and J. Zmuidzinas</i>	332	21-D11
APERTURE SYNTHESIS OBSERVATIONS OF THE 21 CENTIMETER ZEEMAN EFFECT TOWARD ORION A <i>T. H. Troland, C. Heiles, and W. M. Goss</i>	342	21-E9
DUST AND GAS EMISSION IN BARNARD 5 ..... <i>W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman</i>	355	21-F10
FAST WINDS FROM THE CENTRAL STARS OF NGC 6543 AND NGC 6826 <i>M. Perinotto, M. Cerruti-Sola, and H. J. G. L. M. Lamers</i>	382	22-B1
NON-EQUILIBRIUM IONIZATION EFFECTS IN THE SUPERNOVA REMNANT RCW 86 <i>J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock</i>	399	22-C6
MILLIMETER CONTINUUM OBSERVATIONS OF A MASSIVE PROTOSTELLAR CORE IN SAGITTARIUS B2 <i>J. E. Carlstrom and S. N. Vogel</i>	408	22-D3
THE ACCRETION OF INTERPLANETARY DUST BY Ap AND Am STARS <i>C. Krishna Kumar, Joseph M. Davila, and R. Sundar Rajan</i>	414	22-D9
THE EFFECT OF STIMULATED SCATTERING IN COMPACT SOURCES ..... <i>P. Mészáros, G. G. Pavlov, and Yu. A. Shibano</i>	426	22-E7
SPECTRAL EVOLUTION OF ACCRETION DISKS OF DWARF NOVAE. II. RADIATIVE TRANSFER MODELS <i>F. H. Cheng and D. N. C. Lin</i>	432	22-F1
ROTATING STELLAR COLLAPSE MODEL FOR SUPERNOVA SN 1987A ..... <i>T. Nakamura and M. Fukugita</i>	466	23-C8
ON THE GENERATION OF FLUX TUBE WAVES IN STELLAR CONVECTION ZONES. I. LONGITUDINAL TUBE WAVES DRIVEN BY EXTERNAL TURBULENCE ..... <i>Z. E. Musielak, R. Rosner, and P. Ulmschneider</i>	470	23-D1
FURTHER OBSERVATIONS OF THE ECLIPSING X-RAY BURST SOURCE MXP 1659-29 ..... <i>L. R. Cominsky and K. S. Wood</i>	485	23-E4
THE STRUCTURE OF THE BETA PICTORIS CIRCUMSTELLAR DISK FROM COMBINED IRAS AND CORONAGRAPHIC OBSERVATIONS ..... <i>Pawel Artymowicz, Christopher Burrows, and Francesco Paresce</i>	494	23-F1
RX PUPPIS: DETECTION OF ASYMMETRICAL RADIO STRUCTURE <i>J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliveren, A. G. Michalitsianos, and M. Kafatos</i>	514	23-G9
THE CHEMICAL COMPOSITION OF THE EMITTING GAS IN HM SAGITTAE <i>J. A. De Freitas Pacheco, S. J. Codina-Landaberry, and Dalton F. Lopes</i>	520	24-A1
INFRARED EMISSION FROM INTERPLANETARY DUST ..... <i>P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama</i>	528	24-B1
SOLAR ATMOSPHERIC DYNAMICS. III. THE EFFECT OF ACOUSTIC WAVES ON THE Mg II $k$ LINE PROFILE <i>Pierre Gouttebroze</i>	536	24-B12
THE THEORY OF MAGNETOHYDRODYNAMIC WAVE GENERATION BY LOCALIZED SOURCES. I. GENERAL ASYMPTOTIC THEORY ..... <i>William Collins</i>	548	24-C12
INTERMEDIATE-TERM SOLAR PERIODICITIES: 100-500 DAYS ..... <i>J. L. Lean and G. E. Brueckner</i>	568	24-E8
ERRATA		
THE FIRST NEGATIVE ( $B^2\Sigma_u^+ - X^2\Sigma_g^+$ ) SYSTEM OF $^{15}\text{N}_2^+$ ..... <i>S. Paddi Reddy and C. V. V. Prasad</i>	579	24-F5
ON THE VALIDITY OF THE ZEL'DOVICH APPROXIMATION ..... <i>Benjamin Grinstein and Mark B. Wise</i>	579	24-F5
INSTRUCTIONS TO AUTHORS .....	i	24-F6

## 1989 FEBRUARY 15, Number 2

GRAVITATIONAL LENSING BY A SMOOTHLY VARIABLE SURFACE MASS DENSITY <i>Bohdan Paczyński and Joachim Wambsgans</i>	581	26-C1
SURFACES OF CONSTANT REDSHIFT IN AN INFLATIONARY UNIVERSE ..... <i>Alan P. Lightman and William H. Press</i>	598	26-E1
DENSITY CONSTRAINTS ON LOCAL INHOMOGENEITY IN COSMOLOGY ..... <i>J. Eisenstaedt and N. O. Santos</i>	601	26-E4

# CONTENTS

v

	Page	Fiche
PRIMORDIAL HELIUM PRODUCTION BY PREGALACTIC ACCRETING BLACK HOLES .....	<i>Liping Jin</i>	603 26-E6
PRESSURE-CONFINED LYMAN-ALPHA CLOUDS .....	<i>E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann</i>	609 26-F1
IONIZATION BY LINE PHOTONS AND ITS EFFECT ON HYDROGEN LINE RATIOS .....	<i>Wei Zheng</i>	617 26-F9
DIAGNOSTICS OF COMPACT CLUSTERS OF GALAXIES BY GIANT LUMINOUS ARCS .....	<i>Israel Kovner</i>	621 26-F14
THREE-DIMENSIONAL MORPHOLOGICAL SEGREGATION IN RICH CLUSTERS OF GALAXIES ..... <i>E. Salvador-Solé, M. Sanromà, and J. J. Rdz. Jordana</i>	636	27-A1
LIGHT REPROCESSING IN THE ECHO MODEL OF LUMINOUS ARCS .....	<i>Erez Braun and Mordehai Milgrom</i>	644 27-A9
FAR-INFRARED AND SUBMILLIMETER PHOTOMETRIC MAPPING OF SPIRAL GALAXIES IN THE VIRGO CLUSTER ..... <i>A. A. Stark, J. A. Davidson, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey</i>	650	27-B1
OPTICAL AND INFRARED SURFACE PHOTOMETRY OF NGC 3077 .....	<i>Jill S. Price and Craig A. Gullixson</i>	658 27-B10
A FAST-MOVING KNOT OF RADIO EMISSION IN THE ACTIVE GALAXY NGC 1275 ..... <i>J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore</i>	671	27-D1
CO IN OPTICALLY SELECTED STARBURST GALAXIES .....	<i>James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett</i>	680 27-D10
HIGH-RESOLUTION CO OBSERVATIONS OF NGC 1068 ..... <i>Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt</i>	691	27-E7
CO ISOTOPE STUDIES AND MASS OF THE SAGITTARIUS B2 MOLECULAR CLOUD ...	<i>Dariusz C. Lis and Paul F. Goldsmith</i>	704 27-F6
VLA OBSERVATIONS OF THE HIGH-VELOCITY BIPOLAR OH ABSORPTION IN L1551 ..... <i>Luis F. Rodríguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz</i>	712	27-G1
SLOW EXPANSION OF THE SHELL OF THE RECURRENT NOVA T PYXIDIS AND DETECTION OF A FAINT EXTENDED ENVELOPE .....	<i>Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen</i>	720 28-A1
VLBI ANGULAR BROADENING MEASUREMENTS IN THE CYGNUS REGION .....	<i>A. L. Fey, S. R. Spangler, and R. L. Mutel</i>	730 28-B1
COMPARISON OF THE FAR-INFRARED AND CARBON MONOXIDE EMISSION IN HEILES' CLOUD 2 AND B18 ..... <i>Ronald L. Snell, Mark H. Heyer, and F. Peter Schloerb</i>	739	28-C1
NEAR-INFRARED IMAGES OF THE BIPOLAR NEBULA OH 0739-14 ..... <i>C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure</i>	754	28-D2
PROPERTIES OF H II REGION POPULATIONS IN GALAXIES. II. THE H II REGION LUMINOSITY FUNCTION ..... <i>Robert C. Kennicutt, Jr., B. Kevin Edgar, and Paul W. Hodge</i>	761	28-D10
MILLIMETER-WAVE RECOMBINATION LINES FROM RADIO-BRIGHT H II REGIONS .....	<i>M. A. Gordon</i>	782 28-F5
THE OUTER R AQUARI NEBULA: COMPARISON OF 6 CENTIMETER RADIO CONTINUUM AND BALMER LINE EMISSION .....	<i>J. M. Hollis, R. J. Oliversen, and R. Mark Wagner</i>	795 28-G4
RADIO PULSAR SPIN-DOWN: TESTS OF PULSAR MODELS .....	<i>Andrew F. Cheng</i>	803 29-A1
SUPERNOVA 1987A AND THE EMERGENCE OF THE HOT NEUTRON STAR: A SEMIANALYTIC APPROACH ..... <i>David F. Chernoff, Stuart L. Shapiro, and Ira Wasserman</i>	814	29-B1
A SEARCH FOR A DYNAMICAL ATTRACTOR IN CYGNUS X-1 .....	<i>James C. Lochner, J. H. Swank, and A. E. Szymkowiak</i>	823 29-B11
EXO 033319-2554.2: AN ECLIPSING AM HERCULIS SYSTEM SHOWING CYCLOTRON EMISSION FEATURES ..... <i>Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough</i>	832	29-C7
A THIRD X-RAY SPECTRAL MODE IN SCORPIUS X-1: SIMILARITIES TO THE OTHER BRIGHT BULGE SOURCES ..... <i>G. Hasinger, W. C. Priedhorsky, and J. Middleditch</i>	843	29-D4
DOUBLE-CORE EVOLUTION. III. THE EVOLUTION OF A 5 M <sub>⊙</sub> RED GIANT WITH A 1 M <sub>⊙</sub> COMPANION ..... <i>Ronald E. Taam and Peter Bodenheimer</i>	849	29-E1
THE DUPLICITY OF IRAS 16293-2422: A PROTOBINARY STAR? .....	<i>Alwyn Wootten</i>	858 29-E10
MAGNETIC ACTIVITY AND THE DETERMINATION OF THE TIDAL SYNCHRONIZATION TIME IN CLOSE BINARIES ..... <i>James H. Applegate</i>	865	29-F3
POLARIMETRY OF FOUR WOLF-RAYET STARS .....	<i>Regina E. Schulte-Ladbeck and Karel A. van der Hucht</i>	872 29-F10
A ROTATING, MAGNETIC, RADIATION-DRIVEN WIND MODEL FOR WOLF-RAYET STARS ..... <i>Clint H. Poe, David B. Friend, and Joseph P. Cassinelli</i>	888	30-A1

	Page	Fiche
WIND-DISK SHOCKS AROUND T TAURI STARS .....	<i>L. Hartmann and J. C. Raymond</i>	903 30-B6
ON THE STABILITY OF DECELERATING SHOCKS .....	<i>Ethan T. Vishniac and Dongsu Ryu</i>	917 30-C6
FLASHES FROM NORMAL STARS .....	<i>Bradley E. Schaefer</i>	927 30-D2
VLBI AND POLARIMETRIC OBSERVATIONS OF THE SiO MASERS IN R CASSIOPEIAE <i>G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis</i>	934	30-D9
COMET EJECTION AND DYNAMICS OF NONSPHERICAL DUST PARTICLES AND METEOROIDS .....	<i>Bo Å. S. Gustafson</i>	945 30-E6
BORN-APPROXIMATION AND RADIATIVE CORRECTIONS TO PAIR PRODUCTION IN PHOTON-PHOTON COLLISIONS <i>Robert J. Gould</i>	950	30-E11
MINIMUM MACH NUMBER FOR IMPULSIVE PROTON ACCELERATION BY PARALLEL COLLISIONLESS SHOCK WAVES IN SOLAR FLARES .....	<i>Dean F. Smith and Stephen H. Brecht</i>	954 30-F1
ISOTOPE ABUNDANCES OF SOLAR CORONAL MATERIAL DERIVED FROM SOLAR ENERGETIC PARTICLE MEASUREMENTS .....	<i>R. A. Mewaldt and E. C. Stone</i>	959 30-F6
RELATIONS BETWEEN THE PHOTOSPHERIC MAGNETIC FIELD AND THE EMISSION FROM THE OUTER ATMOSPHERES OF COOL STARS. I. THE SOLAR Ca II K LINE CORE EMISSION <i>C. J. Schrijver, J. Côté, C. Zwaan, and S. H. Saar</i>	964	30-F12
SIPHON FLOWS IN ISOLATED MAGNETIC FLUX TUBES. II. ADIABATIC FLOWS .....	<i>Benjamin Montesinos and John H. Thomas</i>	977 31-A1
MAGNETOHYDRODYNAMIC INSTABILITIES IN CORONAL ARCADES .....	<i>Chang-Hyuk An, S. T. Suess, and S. T. Wu</i>	989 31-B1
THE SPATIAL, SPECTRAL, AND TEMPORAL CHARACTER OF THE HARD X-RAY FLARE OF 1982 FEBRUARY 3 <i>Nariaki Nitta, Alan L. Kiplinger, and Keizo Kai</i>	1003	31-C2
g-MODE PULSATIONS IN POLYTROPES: HIGH-PRECISION EIGENVALUES AND THE APPROACH TO ASYMPTOTIC BEHAVIOR .....	<i>D. J. Mullan</i>	1017 31-D4
PROPAGATION OBSERVATIONS OF THE SOLAR WIND NEAR THE SUN .....	<i>W. A. Coles and J. K. Harmon</i>	1023 31-D10
ERRATUM		
THE VELOCITY DISPERSION OF THE GIANT MOLECULAR CLOUDS: A VISCOUS ORIGIN .....	<i>Chanda J. Jog and Jeremiah P. Ostriker</i>	1035 31-E8
ABSTRACTS OF THE ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES, 1989 MARCH ISSUE		
CALÁN-TOLOLO SURVEY. I. SEYFERT 1 GALAXIES .....	<i>José Maza, María Teresa Ruiz, Luis E. González, and Marina Wischnjewsky</i>	1036 31-E11
SPECTROPHOTOMETRY OF CALÁN-TOLOLO SEYFERT GALAXIES: OBJECTS FROM LIST 1 .....	<i>José Maza and María Teresa Ruiz</i>	1036 31-E11
MULTICOLOR SURFACE PHOTOMETRY OF POWERFUL RADIO GALAXIES. I. OBSERVATIONS AND DATA REDUCTION <i>Eric P. Smith and T. M. Heckman</i>	1036	31-E11
APPARENT MAGNITUDES OF LUMINOUS PLANETARY NEBULA NUCLEI. II. A SURVEY OF SOUTHERN HEMISPHERE PLANETARY NEBULAE <i>Richard A. Shaw and James B. Kaler</i>	1037	31-E12
THE STELLAR WINDS OF 203 GALACTIC O STARS: A QUANTITATIVE ULTRAVIOLET SURVEY .....	<i>Ian D. Howarth and Raman K. Prinja</i>	1037 31-E12
THE LUMINOSITY SCALE OF RR LYRAE STARS WITH THE BAADÉ-WESSELINK METHOD. I. PHOTOMETRY AND RADIAL VELOCITIES <i>Tianxing Liu and Kenneth A. Janes</i>	1038	31-E13
LUNAR OCCULTATIONS OF IRAS POINT SOURCES, 1991-2000 .....	<i>L. Cassar, W. P. Chen, and M. Simon</i>	1038 31-E13
LINE IDENTIFICATIONS IN THE ULTRAVIOLET SPECTRUM OF 31 CYGNI .....	<i>Wendy Hagen Bauer and Robert E. Stencel</i>	1038 31-E13
INDEX TO VOLUME 337, PARTS 1 AND 2 .....		See Part 2



# THE ASTROPHYSICAL JOURNAL LETTERS

## CONTENTS OF VOLUME 337, PART 2

1989 FEBRUARY 1, Number 1

	Page	Fiche
ANISOTROPY OF THE DIFFUSE BACKGROUND AT MILLIMETER WAVELENGTHS <i>G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk</i>	L1	25-A6
A SPIRAL GALAXY AT $z = 0.366$ WHICH OVERLAPS THE IMAGE OF THE QUASAR 4C 39.47 <i>Paul Hintzen, W. Romanishin, Craig Foltz, and William Keel</i>	L5	25-A10
BARS AND BARRED SPIRALS: LINEAR THEORY REVISITED ..... <i>M. Tagger, J. F. Sygnet, and R. Pellat</i>	L9	25-B1
HIGH-RESOLUTION CORONAGRAPHY OF THE CIRCUMSTELLAR ENVIRONMENT OF SN 1987A <i>Francesco Paresce and Christopher Burrows</i>	L13	25-B6
HARD X-RAY SPECTRUM OF SUPERNOVA 1987A ON DAY 407 <i>P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye</i>	L19	25-B11
MAGNETIZED NEUTRON STARS AS GAMMA-RAY BURSTERS: DETECTION RATES AT HIGH ENERGIES <i>P. Mészáros, Z. Bagoly, and H. Riffert</i>	L23	25-C1
INFRARED SPECTROSCOPY OF CEPHEIDS: PECULIAR VELOCITY STRUCTURE AND ITS EFFECT ON RADII AND DISTANCES ..... <i>Dimitar D. Sasselov, John B. Lester, and Michael S. Fieldus</i>	L29	25-C7
HD 93521: A HIGH-LATITUDE SHELL STAR ..... <i>Nelson J. Irvine</i>	L33	25-C11
HERBIG-HARO OBJECTS AS THE HEADS OF RADIATIVE JETS ..... <i>John M. Blondin, Ariele Königl, and Bruce A. Fryxell</i>	L37	25-D1
INTERFEROMETRIC OBSERVATIONS OF 1.4 MILLIMETER CONTINUUM SOURCES <i>D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson</i>	L41	25-D5
INTERFEROMETRIC $C^{18}O$ OBSERVATIONS OF DR 21(OH) AND L1551 IRS 5 AT $\lambda = 1.4$ MILLIMETERS <i>S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey</i>	L45	25-D9
THE SOLAR WIND MASS FLUX ..... <i>George L. Withbroe</i>	L49	25-E1
THE RADIAL GRADIENT IN THE SUN'S ROTATION ..... <i>W. A. Dziembowski, Philip R. Goode, and K. G. Libbrecht</i>	L53	25-E5
REACTION CROSS SECTION FOR "SOLAR FLARE NEUTRINOS" WITH $^{37}Cl$ AND $^{16}O$ TARGETS <i>M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto</i>	L59	25-E11
INSTRUCTIONS TO AUTHORS OF LETTERS .....		Inside Back Cover

1989 FEBRUARY 15, Number 2

	Page	Fiche
COSMOLOGICAL PARAMETERS AND EVOLUTION OF THE GALAXY LUMINOSITY FUNCTION <i>David Caditz and Vahé Petrosian</i>	L65	32-A10
DETECTION OF STRONG CARBON MONOXIDE EMISSION FROM THE HOST GALAXY OF THE QUASAR I Zw 1 <i>Richard Barvainis, Danielle Alloin, and Robert Antonucci</i>	L69	32-B1
A GRAVITATIONAL LENS EXPLANATION FOR THE ARCLIKE STRUCTURE IN C1 0500-24 <i>Joachim Wambsganss, Edmond Giraud, Peter Schneider, and Achim Weiss</i>	L73	32-B5

	<i>Page</i>	<i>Fiche</i>
PERIOD DIFFERENCES BETWEEN X-RAY AND VERY HIGH ENERGY GAMMA-RAY OBSERVATIONS OF ACCRETING X-RAY PULSARS ..... <i>K. S. Cheng and Malvin Ruderman</i>	L77	32-B10
DISCOVERY OF A BRIGHT X-RAY NOVA, GS 2000+25 <i>Hiroshi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane Rousell-Dupré</i>	L81	32-C1
VLBI OBSERVATIONS OF SN 1986J: DEVIATIONS FROM SPHERICAL SYMMETRY IN ITS RADIO BRIGHTNESS DISTRIBUTION ..... <i>Norbert Bartel, Michael R. Rupen, and Irwin I. Shapiro</i>	L85	32-C7
STUDYING SHOCKS IN MODEL ASTROPHYSICAL FLOWS ..... <i>Sandip K. Chakrabarti</i>	L89	32-C11
INDEX TO VOLUME 337, PARTS 1 AND 2 .....	i	26-B1
INSTRUCTIONS TO AUTHORS OF <i>LETTERS</i> .....		<i>Inside Back Cover</i>

